Port of Antwerp
A Port Fuelling an LNG Powered Future

Kris De Craene
1. Drivers for LNG
2. LNG in the Port of Antwerp
3. Cooperation and harmonization
1. **New regulations:**
   - SOx
     - IMO: 0.1% since 2015, 0.5% globally by 2020
     - EU: 0.5% in EU waters from 2020
   - NOx, Tier III limitations for all ships built after January 2016 (MEPC)
   - Directive Clean Power for Transport
     - LNG bunker infrastructure in EU sea ports by 2025
   - European regulation non-road mobile machinery
   - European regulation MRV
     - CO2 emissions

2. **Ecological responsibility:**
   - Green image
   - Customer demand

3. **Port Incentives:**
   - ESI – 10% reduction on harbour dues
   - Incentives for technology pioneers
ECAs – NECAs - SECAs
Options to choose from – Why LNG?

LNG is at present the most complete and viable solution on a short to medium term.

<table>
<thead>
<tr>
<th>LNG</th>
<th>Scrubber</th>
<th>SCR</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>LNG as ship fuel would comply with all new regulations</td>
<td>Residues to be delivered at port reception facilities</td>
<td>Extra CO$_2$ emissions</td>
<td>Exhaust gas recirculation</td>
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<tr>
<td>NOx: 85 – 90%</td>
<td>Extra CO$_2$ emissions</td>
<td>Sensitive to SOx</td>
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<tr>
<td>SOx: 100 %</td>
<td>Cools down exhaust gasses</td>
<td></td>
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<tr>
<td>PM: 100 %</td>
<td>Some technical issues need to be resolved</td>
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LNG Challenges

- Safety concerns
  - Onboard vessels
  - In relation to port operations
- Vessel application
  - Added costs for a new build
  - Loss of cargo capacity
- LNG price
  - Difference to MGO/HFO
  - Chicken-and-egg cycle
- LNG bunkering
  - Port regulations and impact thereof on operations
  - Simultaneous cargo operations
- Infrastructure
  - Development of supply chain

Certain issues still need to be addressed

What can be done by ports?
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Develop bunkering procedures and assess the safety aspects of LNG in the port environment

- LNG bunkering procedures implemented on 9/3/2014
  - Ship – to – ship
  - Truck – to – ship
  - Terminal – to – ship

- Bunker suppliers and bunker vessels must have accreditation before first operation
  - To be at HMO at least 14 working days before the first bunker operation
  - After a positive evaluation of the Bunker and Safety Procedures and any other applicable requirements.

- Very much living documents
  - Revision to be expected in 2015

(http://www.portofantwerp.com/nl/havenonderrichtingen-hkd-2015-0)
EFFICIENCY        SAFETY

MAIN GOALS OF LNG BUNKERPROCEDURES
AND CHECKLISTS

CONSISTENCY        SIMPLICITY

CONTROLABLE
LNG in the Port of Antwerp - Regulatory

Truck or terminal-to-ship  25 m

Ship-to-ship  30 m
Develop required supply chain and needed infrastructure

1. LNG bunker terminal

2. LNG bunker vessel / barge

3. Liquefaction

- LNG Feeder vessel
- LNG hub
- LNG transport trucks
- LNG powered trucks
- Inland Shipping
- Seafaring Shipping
Phase 1: truck – to – ship bunkering

- Solution for inland shipping and for sea-going vessels if requiring a small bunker quantity

- November 2012: LNG truck-to-ship bunkering is allowed in the Port of Antwerp
  - 05/12/’12 first LNG truck-to-ship bunkering of an inland vessel in Antwerp

- Since then regular LNG bunkerings of Argonon, Greenstream, Greenrhine Eiger Nordwand and Sirocco in the Port of Antwerp
15/09/15

First truck-to-ship bunkering of an sea-going vessel in Antwerp
Phase 1: terminal – to – ship bunkering

- **Structural solution for inland shipping**
  - Reliable and fast LNG bunkering (efficient, safe, consistent, simple)
  - 24/7 availability of LNG in the Port of Antwerp
  - Possibility to start small and grow with demand

- **Moving forward**
  - Concession of the site with the requirement for an LNG bunkering station
  - Investment and operation by concessionaire
  - Tendering ongoing (Q3 2015)
  - Awarding Q4 2015

➢ **Operational by 2019**
Phase 1: ship – to – ship bunkering

- **Facilitating the market**
  - POA as a supportive and facilitating partner in the efforts towards LNG ship-to-ship bunkering in Antwerp
  - Industry parties building LNG bunker vessels today are actively looking for clients in the Antwerp port area
    - Establishing clear and transparent regulations for the operation of LNG bunker vessels in Antwerp

- **Continuous efforts towards breaking the chicken-and-egg cycle**
  - Continuous market research by the Port of Antwerp
  - Supporting LNG pioneers with reduced harbour fees
    - Via Environmental Shipping Index (10%)
    - Via Particulate matter reduction system (15%)
  - Previous cooperation with Exmar towards the joint development of an LNG-bunkervessel
The Port of Antwerp endeavors to play a proactive and pioneering role in the development of LNG as a fuel for shipping.
Energy Prices: Bunkerfuels and LNG

- NE Asia LNG
- US Henry Hub
- UK NBP
- 380cst bunker prices, Rotterdam
- MGO bunker prices, Rotterdam
- 380cst Low Sulphur Fuel Oil, Rotterdam

Price gap is declining

Current drop in fuel prices

Fukushima
Re-exports to Asia

HH = gas

2010 2011 2012 2013 2014 2015
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Cooperation and harmonization – LNG bunkering procedures

IAPH WPCI LNG Fuelled Vessels Working Group

1. Harmonized port regulations
   – Create bunker checklists to reflect the extra requirements of ports with regards to LNG bunkering operations in a port environment.
   – Some ports might choose the method of accreditation for LNG bunkering companies based on certain conditions. A guideline for the content of these conditions will be developed in this group.
   » Bunker checklists picked-up by SGMF, CCR as well as submitted to ISO technical committee on LNG bunker standards

2. Risk perimeters
   – Create guidance to harmonized approach of risk perimeters of the different possible LNG bunkering scenarios within a port environment.

3. LNG Awareness
   – Get ports moving towards an LNG fuelled future through clear and unbiased information.
   – 28 500 visitors since launch of website

http://www.lngbunkering.org/
Cooperation and harmonization –
LNG bunkering procedures

IAPH WPCI LNG Fuelled Vessels Working Group

Active ports
Consulting ports
Cooperation and harmonization – LNG bunkering procedures

Further ongoing work regarding harmonization

• MOU with Port of Singapore and Zeebrugge on harmonization of LNG bunkering procedures
  – Transformed to a focus group and now including port of Rotterdam
  – Focus: procedures and incident reporting

• Member of SGMF (Society for Gas as a Marine Fuel)
  – Co-author of ‘Guide for LNG Bunkering in Ports’ of SGMF

• Member of LNG subgroup of ESSF (European Sustainable Shipping Forum)

• Member of ICGR (Integral Coordination Group of Regulation) regarding inland shipping

Harmonization of the approach of ports towards developing rules and regulations regarding LNG as fuel and creating LNG awareness.

This is one of the crucial factors for the success of LNG as a fuel!
Rhine Port Group  (Ports of Antwerp, Mannheim, Rotterdam, Strasbourg and Switzerland)

1. Study on concepts and cost-assessment of an LNG bunker-terminal for barges  (Antwerp, Mannheim, Switzerland)

2. Market analysis Rhine Corridor

3. Emergency and incident response

4. Provisions for harmonized European regulations (~LNG bunkering and (un)loading, emergency response, safety)  → CCNR


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Thank you for your attention!

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